



Correlation between Solar spot cycles and planets Jupiter and Saturn

V. Mikula^{1,2}, G. Kletetschka^{1,2,3}, and T. Adachi^{1,2}

¹Department of Physics, Catholic University of America, 200 Hannan Hall, Washington DC, USA

²Astrochemistry, GSFC/NASA, Greenbelt, MD, USA

³Institute of Geology, Acad. Sci. Czech Republic, Prague, Czech Republic



18th Solar seminary at Modra, Slovakia, May 22-26, 2006

Figure 1: Data input

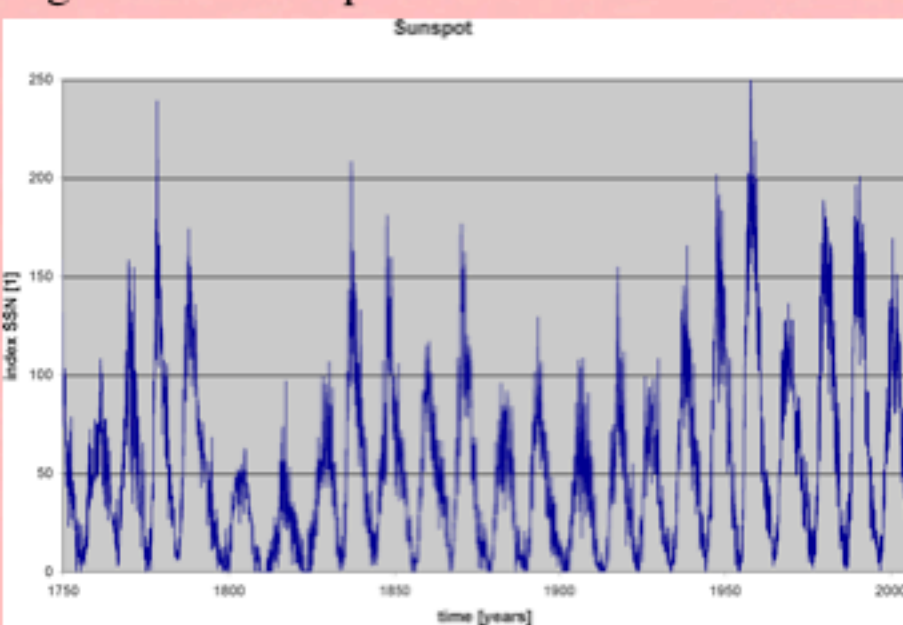
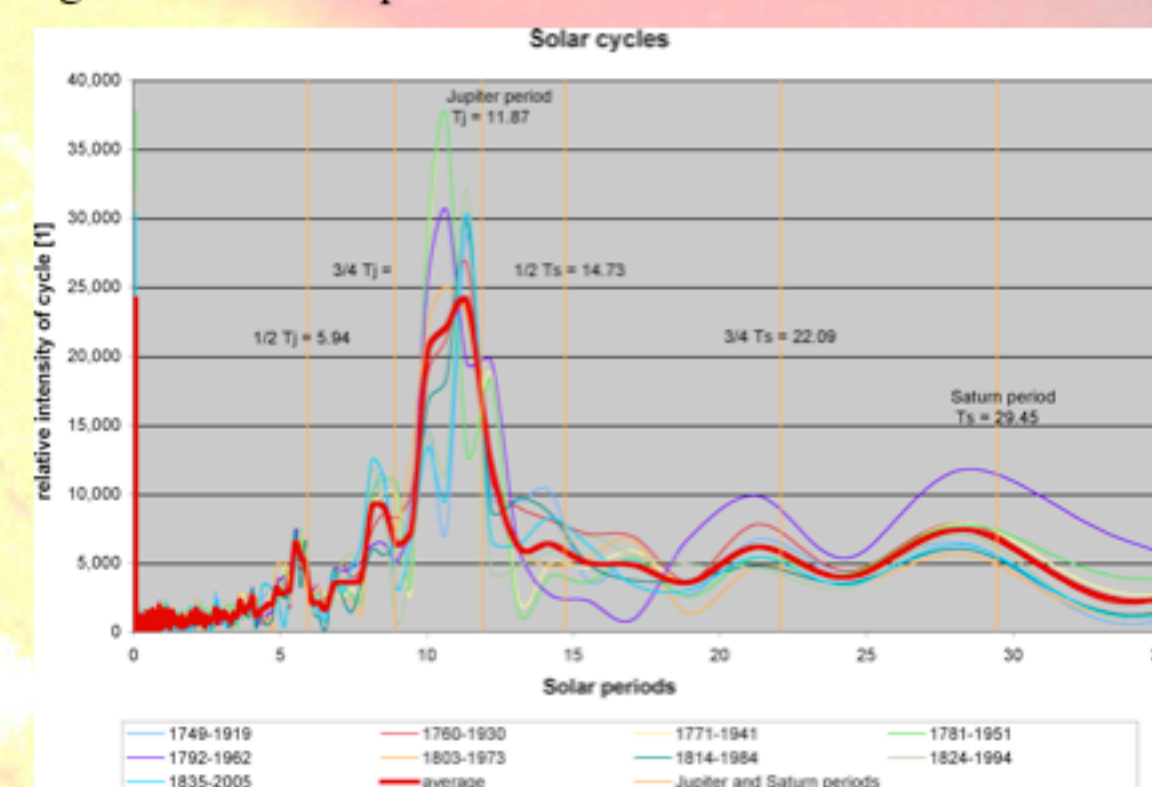


Figure 2: Data output



Introduction:

Solar activity has a variable period from 10 to 12 years. Jupiter's orbital period is 11.87 years. Question: Are there correlations between these two periods?

Calculation method:

We used the Fourier analysis tool within Excel that uses the Fast Fourier Transform (FFT) method to transform data to solve problems in linear systems and analyzes periodic data. Our input data was from the Sun Spot Number (SSN) index^{1,2} (see Figure 1, input). We did nine calculations with different period of years (1749-1919, 1760-1930, 1771-1941, 1781-1951, 1792-1962, 1803-1973, 1814-1984, 1824-1994, 1835-2005). The results are variable and are dependent on the period of years. The thick red line is the average of all the results (see Figure 2, output).

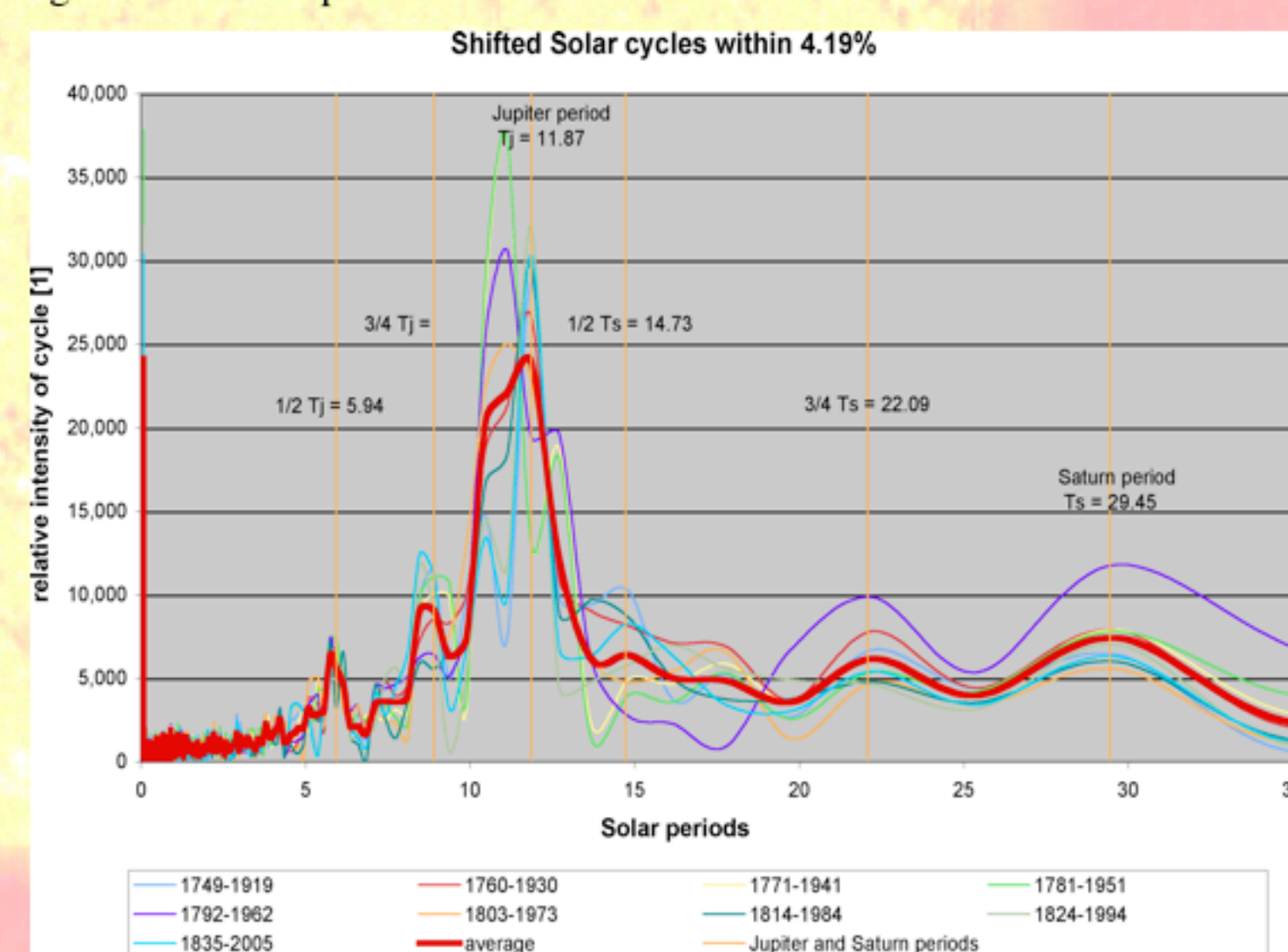
Discussion:

If we shift the results within 4.19%, we have good correlations with Jupiter's and Saturn's orbital periods and they are within $\frac{1}{2}$ and $\frac{3}{4}$ multiples of these periods. Figure 3 shows the results shifted within 4.19%. (We will repeat this calculation using the daily sunspot number. Our prediction is that we will not have to shift the data in this case.)

What causes the correlations between these periods?

- Planets acceleration of gravity creates radial motion of plasma that become subject to Coriolis force and creates "Hurricane in the Solar plasma" = Sunspots.
- Gravity acceleration of the planets creates Solar tides and deforms the Solar sphere. Deformed Solar sphere will intersect with Solar spherical shape controlled by magnetic forces and perturb magnetic layer by forming Sunspots.
- Your idea?
- Or correlations are accidental.

Figure 3: Data output shifted within 4.19%



References:

- [1] Solar Physics, Publisher: Springer Netherlands, Issue: Volume 224, Numbers 1-2, Pages: 5-19, Article: What the Sunspot Record Tells Us About Space Climate, Authors: David H. Hathaway and Robert M. Wilson.
- [2] http://science.nasa.gov/ssl/pad/solar/greenwch/spot_num.txt